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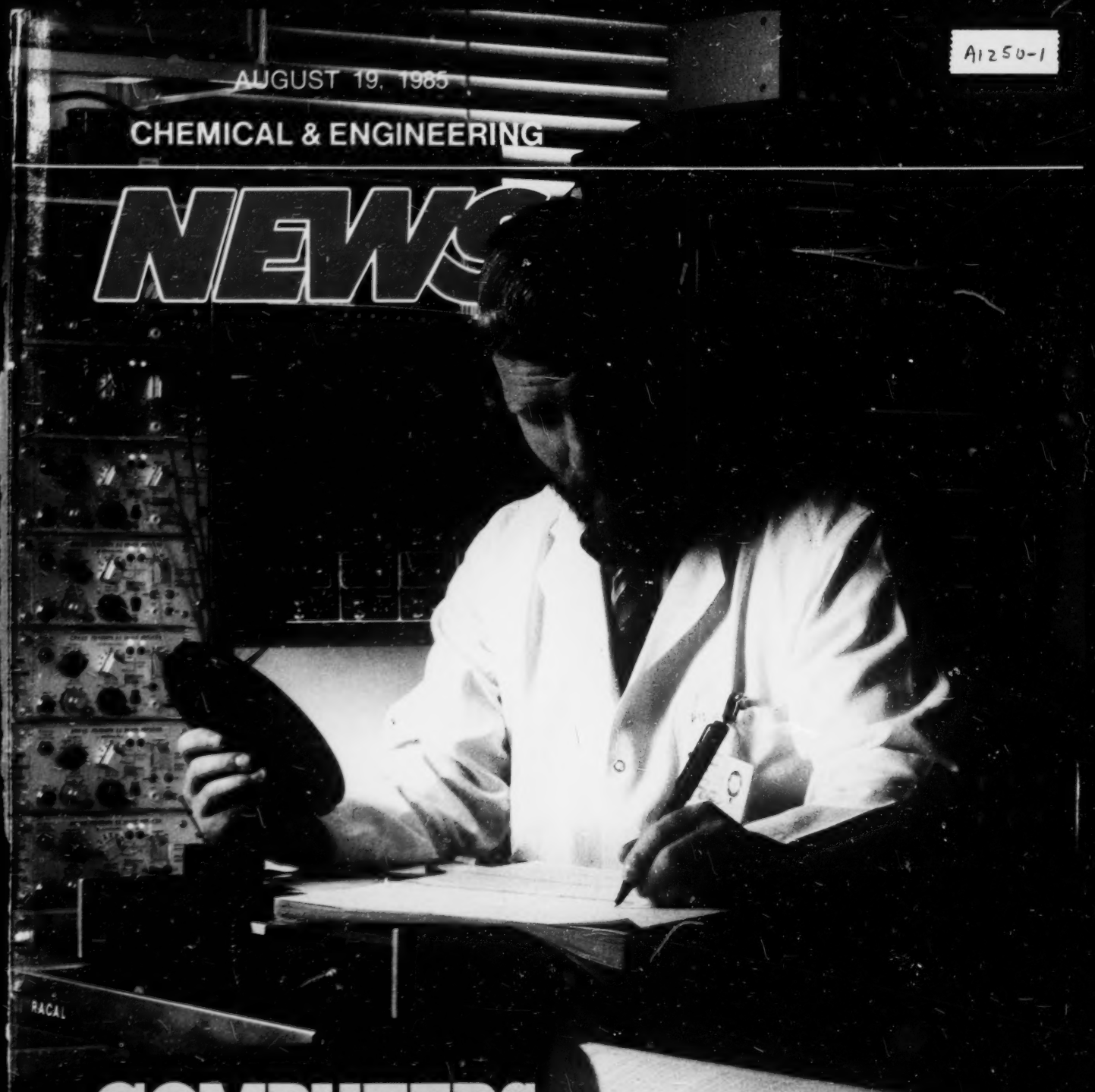
CHEMICAL & ENGINEERING

NEWS



COMPUTERS IN THE LAB

Chemical applications are proliferating Page 21

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NEWS

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AUGUST 19, 1985

News of the Week

■ **Accidents at Union Carbide's plants in West Virginia put company's safety practices back in the spotlight.** **Page 4**

■ **Hazardous materials figured in three incidents last week—a leaking tank truck, a ruptured tank pipe, and a train derailment.** **Page 6**

■ **EPA's refusal to regulate benzene air emissions from certain sources opens door to litigation by environmental group.** **Page 6**

Business

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More and more car makers are accepting alcohol fuels, although some firms, such as Chrysler, aren't sold on methanol. **Page 11**

International Business

Japanese chemical industry's recent economic recovery is slowing down, especially for petrochemical, plastics output. **Page 12**

Government

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EPA should find a permanent solution to clean up Love Canal waste site, says Congressman displeased with agency's plan. **Page 15**

Education

Value of undergraduate research is getting more recognition, but finding adequate funding is still an uphill battle. **Page 17**

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Cover: Computers aid Pfizer scientist's research on calcium-channel-blocking agents

Special Report

Computers no longer are strangers to chemists; through lower-cost hardware and more easily available sophisticated software even the small research lab can support a microcomputer. **Page 21**

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LETTERS

Human failure

SIR: I detect a similarity between the Bhopal disaster and the hijackings that terrorize travelers. In both cases instrumentation safeguards have been provided, but disaster strikes because of human failure. In chemical plants, safety instrumentation, with backup devices, protect against mishaps. However, whenever this equipment is bypassed, intentionally or unintentionally, and insufficient or no routine followup is provided, disaster strikes, and in the case of Bhopal, it assumed enormous proportions.

When traveling by air, I often passed similar electronic equipment at the airport; in some cases, a bunch of keys, etc., caused the alarm to go off, but not in others. Some equipment was more sensitive, or properly adjusted, or possibly checked more frequently than that at other airports.

Thus, the dedication of the people that design, calibrate, operate, and performance-check the safety devices is as important as the devices themselves.

R. Pick
Hollywood, Fla.

Nuclear defense

SIR: I want to state my thanks for the clear illumination of the murky world of nuclear defense and nuclear deterrence in Michael Heylin's editorials of June 10 and 17.

Taken together, the editorials make two points on which I would like to expand. 1. Using our technological edge are we trying to construct a shield and a more effective spear at the same time? Past experience with using a technological approach has always ended with a much more dangerous position for both the superpowers and the rest of the world.

2. The arguments of the weapons labs should be viewed as possibly self-serving. On the one hand they argue that our weapons are less robust than the Soviets' because they rely heavily on high tech, and on the other hand they argue that the Soviets have developed extremely accurate first-strike weapons, which must be based on the cutting edge of technology. If the arguments are put together they are saying that the Soviets have both sophisticated and robust weapons. Assuming all their arguments are correct, our weapons labs have ill served the U.S. in comparison with their opposite number in the U.S.S.R.

While the workers in our weapons facilities are bright and decent individuals, they do have a vested interest in keeping the facilities viable and expanding.

Besides a comprehensive test ban, it would be very useful to get an agreement to stop testing long-range rockets. Using dummy warheads these tests lead to increased target accuracy, a most dangerous component for hair-trigger response.

I believe it is of the utmost importance to seriously engage in mutual confidence building. While the ideals of our open society are in serious conflict with the Soviets' ideals based on a closed society, we should concentrate on the overwhelmingly important mutual bond between us, which President Eisenhower succinctly stated: "We will have either mutual survival or mutual suicide."

We could start with a crisis center, first suggested by the late Senator Jackson, peopled by various kinds of experts from both the North Atlantic Treaty Organization and Warsaw Pact countries. It could be sited in Geneva and have instant communication with all the political leaders to cool any crisis before it got out of hand.

Alvin S. Gordon
Encinitas, Calif.

Halogenated compounds

SIR: Through the years since its inception, the Environmental Protection Agency has been eliminating one halogenated compound after another when careful investigation has shown such a compound to be hazardous. Does it not seem reasonable now on the strength of this exhaustive research to generalize about the hazards of all halogenated organic compounds that may find their way into the body?

I don't think that dioxin (the 2,3,7,8-tetrachlorodibenzo-*p*-dioxin version) is an exception to the dehalogenation phenomenon. It is this particular dioxin's geometry (symmetry) that gives it extraordinary stability and enables the structure to survive except, unfortunately, in areas of high metabolic activity. In a certain sense, all the investigations of the relative toxicity of the halogenated compounds are actually studies of the rate at which dehalogenation occurs in aqueous environments.

Correction

• June 10, page 48: Employment for Celanese in 1984 was 21,500, not 36,000. As a result of this change, total employment in 1984 for the companies listed in the top table was 520,800, a change of −0.2% from the previous year; sales per employee in 1984 were $125,800 in current dollars and $43,600 in constant 1972 dollars.

Effluent Rules Could Have Harmful Effect on Chemical Industry

Most stringent proposals for water pollutants from organic chemical, plastics, synthetic fibers industry would be costly and cut about 10,000 jobs

An economic analysis of the effect of regulations being considered by the Environmental Protection Agency to control water pollutants from the organic chemical, plastics, and synthetic fibers industry says the rules could have pronounced impact on the industry. If the most stringent effluent control guidelines are adopted, the industry could spend more than $1.4 billion in capital investments, and lay off nearly 10,000 workers. That extreme case is not likely to happen, but any of the proposed control levels would have an adverse impact on the industry.

First published in March 1983, the regulations are expected to be completed by spring 1986. They will put additional controls on companies at two levels. The first level is best practicable technology (BPT), which is designed mostly to control so-called conventional pollutants, measured by biochemical oxygen demand and total suspended solids in the effluent. Chemical plants use this routinely to control pollutants. The second level is best available technology economically achievable (BAT) and is used to control particular chemical contaminants, especially those EPA calls priority pollutants.

In the Standard Industrial Classification system, the plants affected by the controls fall under five major headings. These are SIC 2821 (plastic materials and resins), SIC 2823 (cellulosic man-made fibers), SIC 2824 (organic fibers noncellulosic), SIC 2865 (cyclic crudes and intermediates), and SIC 2869 (industrial organic chemicals not elsewhere classified). Those headings are subsequently divided into 11 subgroups. Together, the plants in these categories make up probably the biggest grouping of chemical plants regulated by the agency.

EPA is considering different options for each of the BPT and BAT control categories, as well as regulations for effluent emissions into municipal water treatment facilities. The most stringent options carry the largest price tags and could have the most impact. EPA's economic forecast concludes that the cost of control of conventional pollutants using BPT would be about the same regardless of the option, but great variations arise when considering the cost of the various BAT controls for priority pollutants.

For the most stringent option, BAT controls would be based on biological treatment, in-plant pollution controls, and postbiological treatment by activated carbon adsorption for any remaining toxic pollutants. It is this option that could lead to layoffs of up to 10,000 employees.

The economic projections were made for EPA by Meta Systems of Cambridge, Mass., and are based on about 4000 surveys mailed by EPA to chemical companies. From these it was determined that there are almost 1000 plants comprising the industries affected by the rule. EPA officials say about 200 of those plants are zero dischargers—that is, no pollutants are released from the plant site. The more than 700 remaining plants are expected to experience additional costs no matter what level of control is finally adopted.

According to the analysis, about half those plants, 304, would spend a total of $290 million to control conventional pollutants under EPA's proposed regulations. Based on the survey information, at least four of those plants are in shaky enough financial condition that they might close rather than try to meet the stringent standards. The impacts of BPT controls vary by type of plant. The analysis claims that plants manufacturing organic chemicals, specialty organics, or thermosets would have to pay the greatest costs.

Analysis shows variety of harmful effects of water rules

	Best practicable technology	Best available technology	Pretreatment standards
Number of plants incurring costs	304	306	404
Cost of compliance ($ millions)			
Capital investment	$294.2	$1437.1	$303.8
Operation & maintenance	$ 82.4	$ 400.9	$107.7
Total annual cost of compliance	$136.9	$ 676.8	$166.1
Median profitability reduction	8.8%	33.9%	32.5%
Median production cost increase	0.6%	2.4%	2.5%
Median liquidity reduction	5.8%	26.8%	21.7%
Plant closures	4	20	19
Product line closures	6	19	37
Employment reduction	251	9606	1595

Note: Assumes most stringent options for all categories. BAT expenses include costs and impacts of stringent BPT controls. Source: EPA estimates

Much bigger expenses across the board would be incurred under the rules proposed for cleaning up the priority pollutant chemicals. BAT controls (coupled with the conventional controls) could have an initial price tag of $1.4 billion in capital costs. Of the 11 subdivisions in this category, the hardest hit again would be plants making bulk organics, specialty organics, and thermoset plastics. Under the most stringent control option, the two organic chemical subgroups alone could lose up to 3604 jobs, with the closing of 12 plants out of 87 plants affected. In addition, a number of individual product lines in each of the categories would be eliminated.

A third major category of standards that would seriously affect this large group of industries is pretreatment standards for existing sources (PSES). The EPA analysis finds 404 plants that release toxic metals and organic pollutants into publicly owned treatment works. The subcategory hit hardest by EPA's proposed pretreatment standards is specialty organics, where productivity could be cut 40% when these standards are combined with the other regulations the industry would have to comply with. Fourteen plants would have to shut down all or part of their operations, according to the analysis.

An area where the higher costs of making chemicals might be expected to have an impact is chemical foreign trade. However, the analysis claims that even the most stringent standards for BAT would have minimal effect on this important area.

EPA says it will accept comments on this study, as well as on the proposed regulations, until Oct. 15. To obtain a copy of the draft economic analysis of the effluent limitation standards for the organic chemicals, plastics, and synthetic fibers industry, write to EPA, Analysis & Evaluation Division (WH-586), 401 M St., S.W., Washington, D.C. 20460. □

Permanent cleanup at Love Canal urged

Rep. John J. LaFalce (D.-N.Y.), unhappy with the Environmental Protection Agency's cleanup decision at Love Canal, has asked EPA Administrator Lee M. Thomas to convene a working group to develop a permanent solution for cleaning up the dioxin-contaminated wastes at this infamous hazardous waste site in Niagara Falls, N.Y.

In its May 6 "record of decision," which relies on a contractor's study, EPA calls for interim storage of the wastes either in a concrete vault or in a berm facility, which is a type of landfill. There is no mention of just how interim the storage would be, although an Office of Technology Assessment study of the record of decision and other documents states "there are hints that interim storage might be in effect for as long as 20 years."

According to OTA, EPA's cleanup option is flawed on several counts. The use of a concrete vault for the storage of hazardous waste is untested. A berm facility is plagued by the deficiencies of other forms of landfill: deterioration and failure over time. The costs associated with interim storage are probably underestimated by EPA and its contractor CH2M-Hill. OTA says EPA and CH2M-Hill have neglected to factor in the costs of continuous environmental monitoring and the costs of corrective actions should the storage facility fail.

LaFalce thinks EPA's option is fatally flawed because it fails to consider "long-term permanent solutions for the cleanup of Love Canal." According to an aide, LaFalce "will accept nothing less than a permanent cleanup. A top priority has to be habitability of the viable community of Niagara Falis."

In July, LaFalce got EPA Administrator Thomas' commitment to a permanent cleanup solution, LaFalce's aide says. Staff members from LaFalce's office and EPA are working on legislative language that will spell out this commitment, and such legislation is likely to be introduced this session. Thomas has yet to respond to the Congressman on the formation of a working group to develop a permanent cleanup solution.

C&EN staff photo

LaFalce: EPA's option fatally flawed

In a letter to Thomas, LaFalce writes that thermal destruction of dioxin-contaminated wastes is a proven and cost-effective technology. This runs contrary to the advice EPA received from CH2M-Hill.

The OTA study, which LaFalce requested, says that a mobile pyrolytic destruction unit called the Huber Advanced Electric Reactor has proven itself at Times Beach, Mo. There, the unit destroyed dioxin in the tainted soils to levels below 1 ppb, the EPA standard, with virtually no release of toxic air pollutants.

The Huber unit is now available commercially. If used at Love Canal, cost of permanent cleanup would be about $60 million, OTA estimates, far lower than CH2M-Hill's $100 million estimate. CH2M-Hill figures the cost of interim storage at only $10 million. But as OTA points out, this low figure does not include monitoring costs, nor does it include the eventual cost of permanent cleanup.

LaFalce urges Thomas to implement a permanent cleanup solution now. He writes Thomas: "To have the lowest cost for permanent technology is to purchase it today when companies are eager to prove their technologies effective and [when they] may be more willing to cut profit margins, or even [take] a 'loss-leader' approach."

Lois Ember, Washington